IHRA BIOMECHANICS WORKING GROUP

Atlanta, Georgia

~~Draft~~*Final minutes*
November 9, 2000

Attendees:

Rolf Eppinger	Chairman/ NHTSA
Jac Wismans	TNO/ EU/ EEVC/ WG12
Farid Bendjellal	OICA/ Renault
Koshiro Ono	JARI/ Japan
Minoru Sakurai	JMOT/ JARI Japan
Fumio Matsuoka	JAMA/OICA Japan
Matthew Maltese	NHTSA/ observer
Michael vanRatingen	TNO/ observer
Priya ~~Prassad~~Prasad	
Mark Terrell	DoTRS/ Australia
Dainius Dalmotas	Secretary/ Transport Canada
Suzanne Tylko	Transport Canada
Risa Scherer	WorldSID/ Observer

1. INTRODUCTIONS
2. AGENDA
   - 2.1. No written agenda was distributed
   - 2.2. Plan for meeting is to review member contributions to draft IHRA report.
   - 2.3. Jac Wismans requested discussion of frontal impact dummy initiatives.
   - 2.4. Jac Wismans requested that neck injury/ whiplash discussion be included; members noted that this subject would only be addressed in future if the WG mandate was renewed/ extended.
3. PREVIOUS MINUTES were distributed;

➢ **Members are requested to review these and send comments / corrections directly to the secretary by Nov. 30.**

4. PRESENTATIONS
   - 4.1. World SID Update given by Risa Scherer
     - 4.1.1. Everything is on board contained in the DAS units.
     - 4.1.2. 63 channels are expected to comprise the standard.
     - 4.1.3. Invitations for WorlSID launch were distributed to members. Members are requested to register on line to assist organizers of the event.
   - 4.2. Accident Review provided by D. Dalmotas
     - 4.2.1. Intention is to develop a common metric to compare world data available and repeat current analysis
     - 4.2.2. Farid Bendjellal would like to obtain an agreed upon definition that he can present to European organizations to obtain further data and/or input.
     - 4.2.3. Reminded by the chairman to focus the analysis on dummy program/ specifications
     - 4.2.4. Paragraph 5 in written report for Japan: Data source needs to be referenced in document; 11000 fatalities seems rather high to Mr. Sakurai who suspects that this may be old data.

➢ **Mr. Dalmotas will attempt to develop a "harmonized definition" of side impact for the purposes of world database comparisons.**

➢ **The data presented in the current report will be re-analyzed using the revised definition.**

➢ **Mr. Dalmotas will check the references and confirm the values reported for Japan.**

➢ **Mr. Sakurai will look to see if he can bring more current data to the table.**

4.3. Australia Mark Terrell

4.3.1. Document is complete and M. Seyer is awaiting feedback to finalize.

4.3.2. Document has been circulated and accepted by members.

4.3.3. One exception noted by M. Bendjellal who requests that the units be included in the tables.

➢ **Mr. Terrell will include appropriate units into the tables.**

4.4. US/ NHTSA Mat Maltese presented Test Procedures

4.4.1. HEAD

4.4.1.1. Mr. vanRatingen stated that padded test (2) should not be included, EEVC believes that padded test results include fractures and for this reason should be excluded regardless of availability of padding. Mr. Maltese countered that current padded head tests are non-fracturing but that there are some fractures in the non-padded tests.

4.4.1.2. The chairman reminded members that HIC curve needs to be revised if fractures are not to be included.

4.4.1.3. M. Terrell noted that further filter definition would be desirable.

4.4.1.4. Mr. vanRatingen informed members that the EEVC retained only one test condition corresponding to Test 1 due to poor descriptions of padded materials and fractures. EEVC decided to consider only non-fractured cases. NHTSA has obtained force deflection characteristics for the padding from the authors. Could potentially drop extreme fractures. Additional tests help you gain pulse width.

4.4.1.5. Mr. Bendjellal noted that we as a committee can consider a combination of options whereby some tests are included as the basis and others are presented as desirable thus eliminating the need to completely drop the padded or fracture data.

4.4.1.6. Rear head impact requirements could be included as a third, less critical option.

4.4.1.7. Mr. Wismans noted that the number of tests suggested will affect the economics.

4.4.1.8. Mr. vanRatingen suggested THOR requirements be considered (though the neck is not an issue for short duration impacts)

➢ **Mr. Maltese will bring THOR requirements to the WG for the next meeting.**

4.4.2. NECK

4.4.2.1. Keep test 1, delete test 2 and retain test 3.

4.4.2.2. Mr. Bendjellal suggests that the current test 2 be retained until further data becomes available, Mr. vanRatingen & Mr. Wismans suggest we look at the NHTSA sled test results to see if this can support test 2.

4.4.3. THORAX Medical College of Wisconsin (MCW) sled tests

4.4.3.1. Corridors drawn if minimum of 3 tests were available +/- one SD.

4.4.3.2. There were difficulties with chest band data acquisition. Mrs. Scherer asks if chest band measurement should be a requirement if there are problems. Mr. Maltese clarified that difficulties were not encountered on all tests.

4.4.3.3. There is disparity between the number of rib fractures reported by VRTC and MCW. A far greater number of rib fractures were reported at VRTC, NHTSA believes that these differences are due to differences in autopsy reports; Force response is comparable, impact conditions are the same.

➢ **Mr. Maltese will check to see if age, sex and mass of cadavers were comparable for both VRTC and MCW**

4.4.3.4. Probably advisable to retain all test specs (deflections, spine, rib, and pelvis accelerations) The more of these conditions the dummy can mimic the better off we will be.

4.4.3.5. There are two chest deflections half thorax and full thorax. Need to see which predicts injury better. Sashi Kuppa used full thorax in her analysis.

- **Mr. Maltese will compare the prediction for the full vs half thorax.**

4.4.4. PELVIS

4.4.4.1. Pelvis offset tests not exactly human like. Will try to incorporate intra-abdominal pressure and muscle contribution in modeling.

4.4.4.2. Wayne State load wall based on 9790 , 8.9m/s padded test (only one with >1 test) results tend to be more severe than those of MCW tests with the exception of the pelvis. Possibly due to wall geometry differences, padding, and deflections which include the arm.

- **Mr. Maltese will seek further improvements in the existing model.**

4.4.5. SHOULDER

4.4.5.1. Mr. Bendjellal expressed concern about dropping data due to the unavailability of padding. There must be ways to reproduce that performance. Mrs. Scherer stated that in ISO the padded tests are included but are not required.

4.4.5.2. Priorities may be required for the pendulum and sled tests given that results may drive design in different directions. Dr. ~~Prassad~~Prasad reminded members that the pendulum evaluates local response. Mrs. Scherer suggests that a weighting factor may be a viable option. Members expressed support for the inclusion of both tests.

- **Mr. Wismans will take the NHTSA results back to the EEVC working groups for review in December.**

4.4.5.3. Weighting issue will be discussed at the next meeting.

4.4.6. ABDOMEN

4.4.7. PELVIS

4.4.7.1. There are new corridors based on an energy approach which have been proposed by INRETS.

4.4.7.2. Force-deflection will not be included for the moment until data can be reviewed. Only the force time history will be included.

4.4.7.3. Energy vs force plot used by EEVC should also be included in the WG document.

- **Mr. Maltese will add the energy plots to the existing document with the assistance of Mr. vanRatingen.**

4.4.8. MISCELLANEOUS

4.4.8.1. Mr. Wismans inquired whether the new shoulder data from Ohio presented at Stapp should be included;

4.4.8.2. Mr. Wismans recommends that the WG freeze test procedures. Chairman responded that given time frame we need to go with what is available;

4.4.8.3. Mr. Wismans suggested that the introduction of the document (Section 1 of the dummy specs) should perhaps be more general making reference to discussions that have taken place within the WG.

- **Mr. Wismans / Mr. vanRatingen will draft a revised introductory paragraph.**

4.5. Injury Criteria

4.5.1. Dr. ~~Prassad~~Prasad suggests that the group must reach a consensus regarding the injury criteria to be recommended . Members are in agreement with this approach.

- **Each member representative will submit their recommendations/ arguments (scaling for size or age if necessary) for injury criteria and biomechanical limits to Dominique by December 31, 2000.**

5. Dummy evaluation
   5.1.1. Resources are not currently available to address dummy evaluation prior to ESV. This may be an appropriate task to include if IHRA working group continues.
6. Frontal dummy initiatives
   6.1.1. Biofidelity requirements for frontal impacts. Exchange of data between EEVC and NHTSA re THOR. NHTSA would like to cycle through data to identify difficulties/ issues. If additional issues come up there would be a need for a procedure to incorporate the requirements.
   6.1.2. Japan mentioned that they require the steering committee to identify the frontal dummy as a work item in order to address the issue. The Chairman explained that the frontal issue was already identified as an important area to consider however priority at the present time has been given to side impact .
   6.1.3. There has been agreement within the EEVC frontal dummy consortium that data generated by NHTSA and EEVC will be placed in the public domain.
7. Next meeting Lyon January 29, 30 2001